MANSON ENGINEERING INDUSTRIAL LTD.

SERVICE MANUAL
FOR
SPS-9400

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1. *PRODUCTION SPECIFICATION*

MODEL: SPS-9400-000	REV. 1.0	DATE: 24-8-2000
DESCRIPTION: 3-15V 40A SWITCHING MODE POWER SUPPLY		
INPUT VOLTAGE: 207-245 VAC	FREQUENCY: 50 Hz	
ENVIRONMENT TEMPERATURE: 25 ^{0}C		

	MIN.	TYP.	MAX.	UNIT
Rated Output Voltage Range	3		15	V
Max. Output Voltage	15.1		16.1	V
Min. Output Voltage			3	V
Fixed Output Voltage	13.5	13.8	14.3	V
Output Current (continue)		40		A
Protection Current (start point)	43	43.5	44.5	A
Over Voltage Protection	16	16.5	17	V
Voltage Regulation:				
Load (0~100% load)			200	mV
Line (207~254Vac Varition)			50	mV
Ripple & Noise (r.m.s)		2	5	mV
Ripple & Noise (peak to peak)		30	50	mV
No Load Input Current			380	mA
Full Load Input Current			3.5	A
Power consumption at 15V			770	W
Insulation Resistance (500Vdc)	100			MΩ
Withstanding Test (10mA 60s)	2.1			KV
Power factor	97			%
Efficiency:				
Loading 13.8V 40A	78	80		%
Loading 15V 40A	79	82		%
Meter Accuracy:				
Voltmeter			±1%1+1	Dight
Ammeter			±1%1+1	Dight
Fuse		5		A

REMARKS:

1. Rated load is 15V 40A.
2. Insulation resistance is measured as INPUT vs. HOUSING.
3. High frequency interference test (sample 3%).
   Test frequency : 1. 437 MHz (5W) 2. 144 MHz (5W)
   Result : No function have been affected. Output Voltage 0.5V Variation.

2. ALIGNMENT PROCEDURE

Equipment	Quantity
CRO	1
Digital Multimeter	1
High Frequency Micrometer	1
Electronic Load	1
Adjustable AC Transformer	1
Power Analyzer	1
DC Regulated Power Supply (Max. V>17)	1

Procedures:

1. No Load Input Current Measurement

Switch ON the SPS-9400, the Power Indicator Should light up in green, the fan rotates in a low speed. The SPS-9400 Ammeter should display 00.0, the Voltmeter should not display 00.0, the Power Analyzer should display a current of less than 380mA.

2. Voltmeter Adjustment

Switch SW2 located at the bottom side of the unit to position “FIXED”, connect a Digital Multimeter to the output terminal of SPS-9400, adjust RV4 such that the Digital Multimeter display a voltage of 13.81 ~ 13.84V. Turning the control knob on the front panel will make no change to the output voltage. Switch SW2 to another position, turn the control knob on the front panel to fully-clockwise position, adjust RV2 such that the Digital Multimeter display 15.4 ~ 15.6V, then turn the control knob to fully-counterclockwise position, the Digital Multimeter should display a voltage of less than 3V.

3. Protection Current Adjustment

Adjust the output voltage of SPS-9400 to 15V by turning the control knob, turn RV3 to fully-clockwise position, connect the Electronic Load, slowly adjust the loading current to 44.5A. Then, slowly turn RV3 in counter-clockwise until the overload red LED indicator lights up and the output voltage falls suddenly. Afterward, decreases the loading current to 0A, the red light should OFF and the output voltage returns to normal condition. Then, slowly increases the loading current, when the loading current is 43 ~ 44.5A, the overload red LED indicator will light up and the output voltage will fall.

4. **Power Consumption Test**

Adjust the output voltage of SPS-9400 to 15V and connect the electronic load with 40A loading current, the Power Analyzer should display an input current of less than 3.5A, power factor of more than 0.97 and input power of less than 770W.

5. **Voltmeter Calibration**

Adjust the output voltage of SPS-9400 to 15.0V, connect the Digital Multimeter to the output terminal of SPS-9400, adjust the variable resistor on the Voltmeter such that the voltage display on the Digital Multimeter is equal to the voltage display on Voltmeter. Then, check that the voltage on the Voltmeter increases as the control knob is turned in clockwise direction. Similarly, check that the voltage decreases as the control knob is turned in counterclockwise direction. Also, the difference between the voltage on Voltmeter and the Digital Multimeter should less than 0.2V. And check that the LED Voltmeter does not have missing segment.

6. **Ammeter Calibration**

Connect the Electronic Load with 40A loading current, adjust the variable resistor of Ammeter such that the Ammeter displays 39.9. Then, check that the current on Ammeter increases as the loading current on the Electronic Load increases. Similarly, check that the current on Ammeter decreases as the loading current on the Electronic Load decreases. Also, the difference between the current on Ammeter and the Digital Multimeter should less than 0.4A. And check that the LED Ammeter does not have missing segment.

7. **Over-Voltage Protection Test**

Adjust the output voltage of the DC Regulated Power Supply to 15.9V and connect to the output terminal of SPS-9400, then disconnect it and the SPS-9400 is in working condition. Adjust the output voltage of the DC Regulated Power Supply to 16.9V and connect to the output terminal SPS-9400, then disconnect it. The overload red LED indicator of SPS-9400 will light up and the output voltage will fall.

8. **Load Regulation Measurement**

Adjust the output voltage of SPS-9400 to 15V and connect to the Electronic Load with 40A loading current, measure the output voltage by the Digital Multimeter and record the voltage. Then, disconnect from the load and measure the output voltage again. The difference between 2 voltages should less than 200mV.

9. Ripple and Noise Measurement

Adjust the output voltage of SPS-9400 to 15V and connect to the Electronic Load with 40A loading current. Measure the output terminal by the High Frequency Micrometer and the value should less than 5mV. Connect the output terminal to CRO and the Peak to Peak measured wave form should less than 50mVp-p.

10. Line Regulation Measurement

Adjust the output voltage of SPS-9400 to 15V and connect to the Electronic Load with 40A loading current. Adjust the input voltage to 190V and 254V, record the output voltage at these 2 input voltages, the difference between these 2 output voltages should less than 50mV.

11. Loading Test

Adjust the output voltage of SPS-9400 to 15V and connect to the Electronic Load with 40A loading current, turn OFF the SPS-9400. Then, make sure the Electronic Load has a 40A loading current, turn ON SPS-9400 again and check that the SPS-9400 is ON and the Overload Indicator is OFF.

Remarks:

1. The above procedures should be carried out in normal condition, if the SPS-9400 has abnormal condition (e.g. Unpleasant noise, smell , smoke, etc...), turns OFF the AC source at once**.**

3. <u>Trouble Shooting</u>

1. The Power Supply do not turn ON.

   a. Switch off the unit.

   b. Check the fuse if it is blown, replace with the same type of the fuse.

   c. Check the AC Power Cord is firmly plugged into the AC socket of the Power Supply.

   d. Switch on the unit again if problem persists.

2. Overload LED Indicator light up once the unit is turned ON.

   a. Check if the loading current is not more than 40A, adjust the loading current of not more than 40A

   b. Check if the output voltage is not more than 16.5V. The Over Voltage Protection is at 16.5V.

   c. Check if the output is short circuit.

   d. Switch off the unit, wait 30 minutes and switch it ON again to see if problem persists.

4. ***CHANGE OF ELECTRONIC COMPONENTS*** **(Fig.1)**

	Name of Component	Position	Before changes	After changes	Date of Change
1	Electrolytic Capacitor	C10,C11	680uF/200V	680uF/250V	14/09/01
2	Auxiliary Transformer	TR2	0.23mm/96T	0.15mm/136T	18/09/01
3	Fast Recovery Diode	D2	MUR880	MUR860	18/01/02
4	Metal Film Resistor	R9	1.3Mohm 1/4W ± 1%	620K1/4W ± 1% & 680K1/4W ± 1% in series	28/02/02
5	Carbon Film Resistor	R13	470kohm 1/4W ± 5%	240kohm1/4W ± 5%& 240kohm 1/4W ± 5% in series	28/02/02

Reason of Changes:

1. The voltage of 680uF/200V Electrolytic Capacitor is too low.
2. The 0.23mm/96T Auxiliary Transformer does not match to our design of the SPS-9400.
3. When using MUR860, the voltage drop across the diode decreases, thus its temperature is lower.
4. The wattage of the Metal Film Resistor 1.3Mohm 1/4W ± 1% is too low.
5. The wattage of the Carbon Film Resistor 470kohm 1/4W ± 5% is too low.

Red Circle indicate the changes

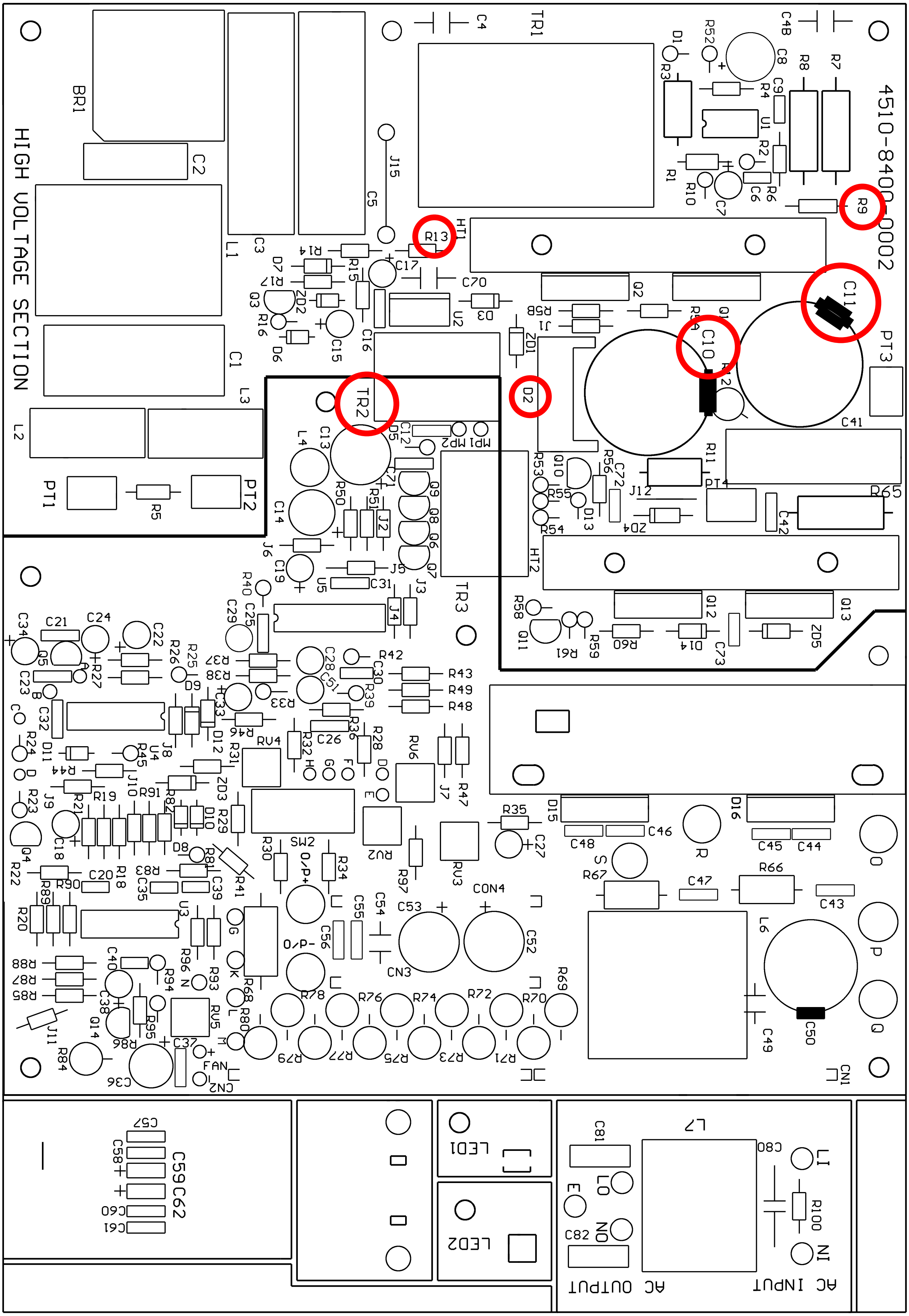
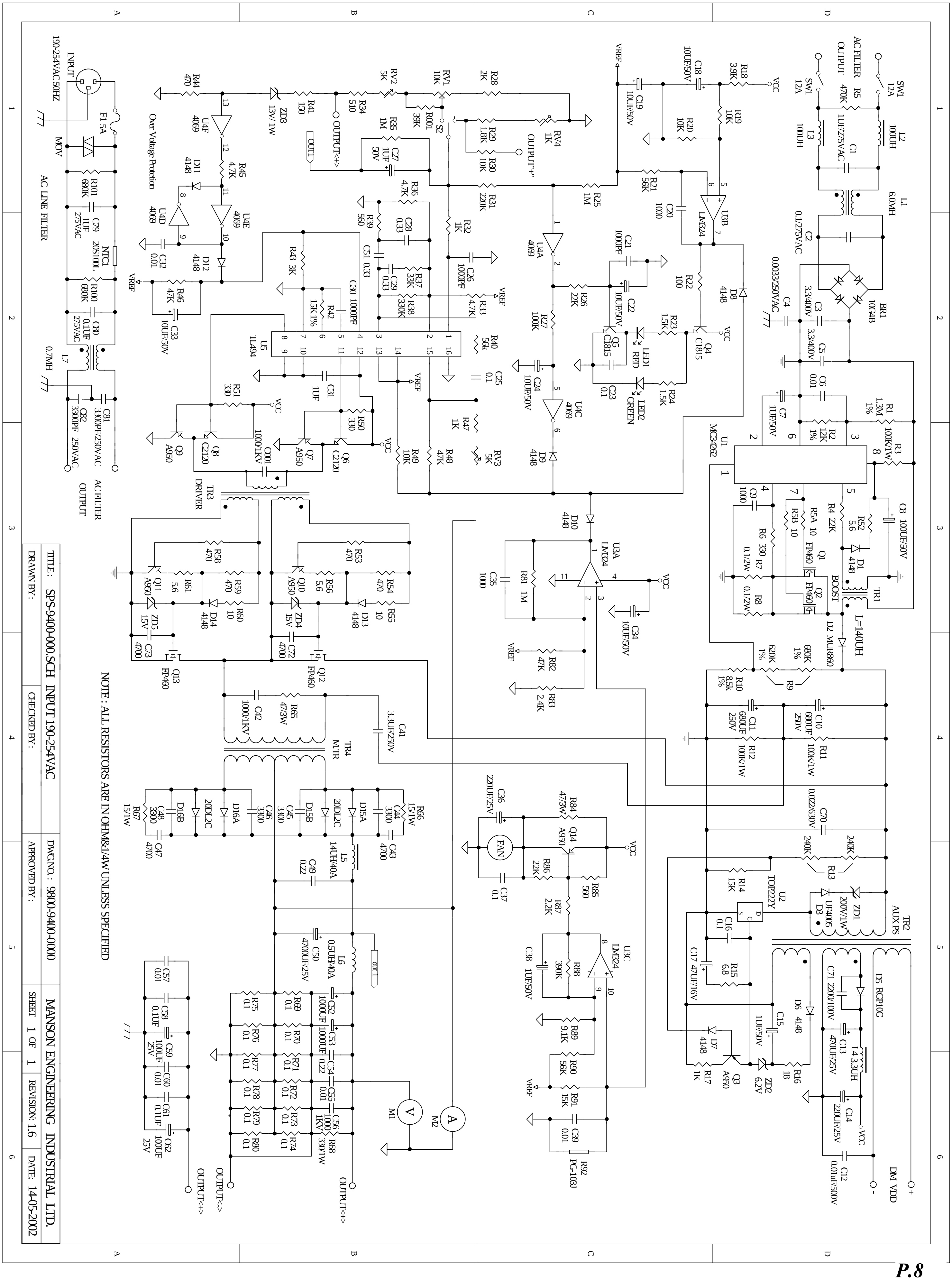
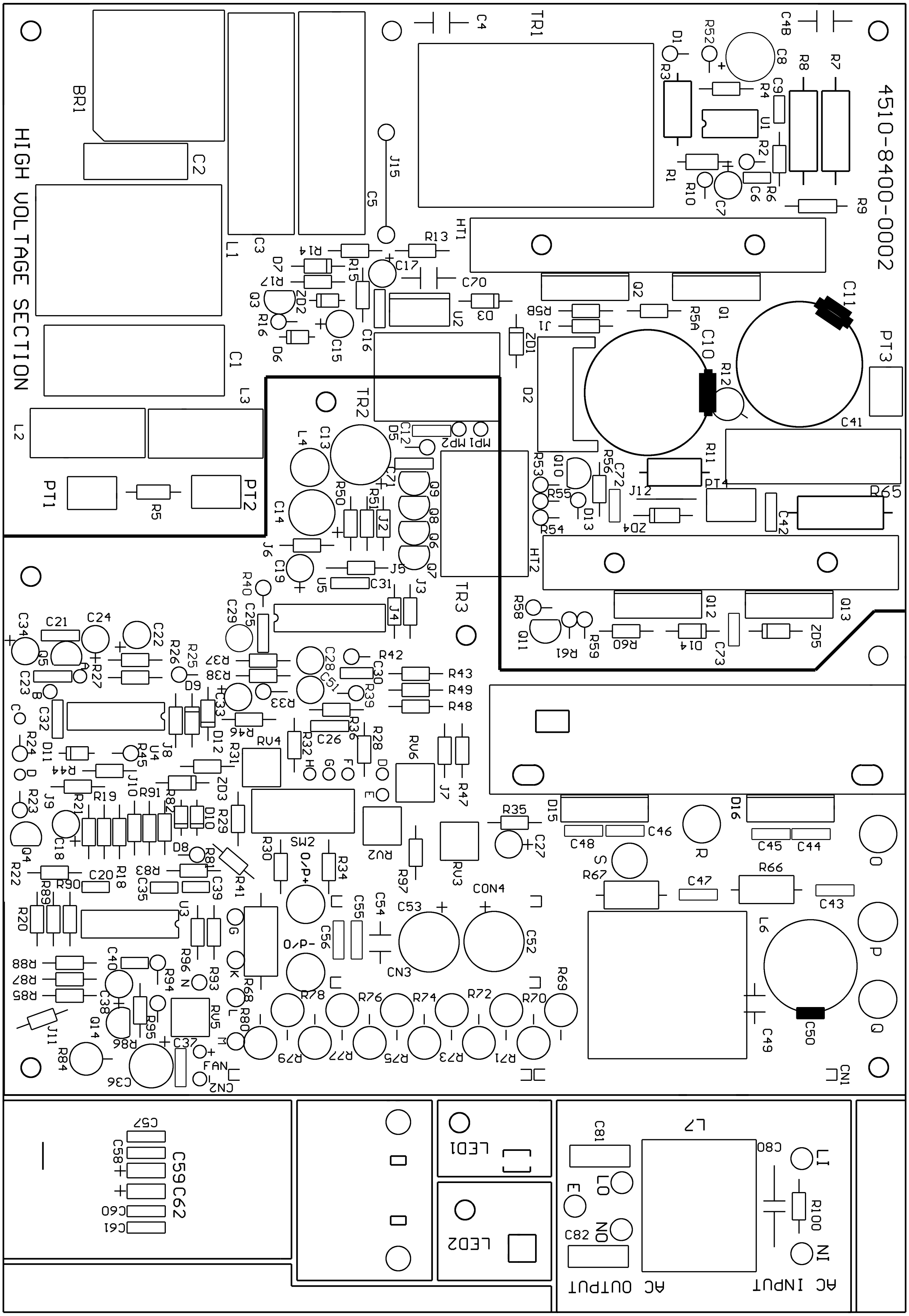


Fig.1

5.1 SCHEMATICS



5.2 PCB SILKSCREEN



6. BILL OF MATERIAL

Model #: SPS-9400-215
Description: 3-15Vdc, 40A SWITCHING MODE POWER SUPPLY W/DIGITAL METERS
Rev Date: 03/10/2002

Level	Code #	Description/Remarks	Usage	U/M	Op
0	8710-8400-0099	DRIVER TRANSFORMER ASSEMBLY	1.00000	SET	
0	8710-8400-4099	SPS-8400 TRANSFORMER ASSEMBLY FOR POWER FACTOR CONTOLLER	1.00000	PCS	
0	8760-8400-0099	EMI FILTER 230V VERSION CE	1.00000	PCS	
0	8761-4000-3099	OUTPUT FILTER INDUCTOR SUB.ASSEMBLY 14UH/40A	1.00000	PCS	
0	SPS-8400-PA-000	SPS-8400-000 MATERIAL FOR PACKING	1.00000	SET	PA
1	7615-0900-0000	Q.C. PASSED LABEL 37X14mm SILVER W/BLACK LETTERING	1.00000	PCS	PA
0	SPS-8400-TR-000	SPS-8400-000 MATERIAL FOR TRANSFORMER (T8400000)	1.00000	SET	TR
0	SPS-9400-CA-000	SPS-9400-000 MATERIAL FOR CASING	1.00000	SET	CA
1	3113-0460-1303	N-CHANNEL POWER MOSFET IRFP460 Location : Q12,Q13,Q1,Q2.	4.00000	PCS	CA
1	3232-0020-9242	FAST RECOVERY RECTIFIER 20DL2C41 "TOSHIBA" Location : D15,D16.	2.00000	PCS	CA
1	3601-2751-1301	METAL OXIDE VARISTOR "HARRIS" V275LA20A Location : Z1,	1.00000	PCS	CA
1	3631-1045-0019	F.Y.I. THERMISTOR NTC 10K AT 25DEG B=3720K DIA. 1.85 Location : R92	1.00000	PCS	CA
1	3675-0502-1602	FUSE 5A 250V VDE APPROVAL 20mm STANDARD GLASS TUBE Location : F1	1.00000	PCS	CA
1	4021-0204-5038	LED EL204GD DIA. 3mm DIFFUSED GREEN "EVERLIGHT" Location : LED2.	1.00000	PCS	CA
1	4199-9400-9903	DUAL LED PANEL METER MODULE FOR SPS-9400	1.00000	SET	CA
2	0513-1006-0611	CARBON FILM RESISTOR 1/4W 1Mohm +/-5% Location : R4,R5,R12,R13.	4.00000	PCS	IN
2	0513-4702-0611	CARBON FILM RESISTOR 1/4W 470ohm +/-5% Location : R19,R20.	2.00000	PCS	IN
2	0522-1005-0411	METAL FILM RESISTOR 1/4W 100Kohm +/-1% Location : R1,R10,R6,R7.	4.00000	PCS	IN
2	0522-1505-0411	METAL FILM RESISTOR 1/4W 150Kohm +/-1% Location : R14,R15.	2.00000	PCS	IN
2	0522-2003-0411	METAL FILM RESISTOR 1/4W 2Kohm +/-1% Location : R16,R17.	2.00000	PCS	IN
2	0522-4705-0411	METAL FILM RESISTOR 1/4W 470Kohm +/-1% Location : R3,R18.	2.00000	PCS	IN
2	0522-5606-0411	METAL FILM RESISTOR 1/4W 5.6Mohm +/-1% Location : R8,R9.	2.00000	PCS	IN
2	0522-7503-0411	METAL FILM RESISTOR 1/4W 7.5Kohm +/-1% Location : R11	1.00000	PCS	IN
2	0685-2224-1110	SEMI-FIXED POTENTIOMETER SCR-065A 22K(B)+/- 25% DIA.6mm Location : VR1,VR2.	2.00000	PCS	IN
2	1011-1023-0171	CERAMIC CAPACITOR 100PF 50V	2.00000	PCS	IN

			+/-10%	
		Location :	C11,C18.	
2	1011-1041-0171		CERAMIC CAPACITOR 0.01UF 50V +80%/-20%	2.00000 PCS IN
		Location :	C10,C12.	
2	1011-1051-0151		CERAMIC CAPACITOR 0.1UF 25V +80%/-20%	3.00000 PCS IN
		Location :	C2,C3.	
2	1011-1523-0171		CERAMIC CAPACITOR 150PF 50V +/-10%	2.00000 PCS IN
		Location :	C16,C17.	
2	1021-2272-0151		ELECT. CAPACITOR 22UF 25V +/-20% DIM. 5 X 11 MM	1.00000 PCS IN
		Location :	C6.	
2	1021-2282-0131		ELECT. CAPACITOR 220UF 10V +/-20% DIM. 6 X 12 MM	1.00000 PCS IN
		Location :	C4.	
2	1021-4782-3142		ELECT. CAPACITOR 470UF 16V +/-20% DIM. 8X12mm PITCH 3.5mm	1.00000 PCS IN
		Location :	C1.	
2	1028-4762-0171		NON-POLAR ELECT.CAPACITOR 85c 4.7uF 50V +/-20% DIM.5X11mm	1.00000 PCS IN
		Location :	C5	
2	1062-1054-0181		METALLIZED POLYESTER CAP 0.1UF 63VDC +/-5% BOX TYPE	2.00000 PCS IN
		Location :	C9,C15.	
2	1062-2253-0181		METALLIZED POLYESTER CAP 0.22UF 63VDC +/-10% BOX TYPE	2.00000 PCS IN
		Location :	C8,C14.	
2	1062-4743-0181		METALLIZED POLYESTER CAP 0.047UF 63VDC +/-10% BOX TYPE	2.00000 PCS IN
		Location :	C7,C13.	
2	2531-7805-3068		IC 7805CV "SGS" POSITIVE DC VOLTAGE REGULATORS	1.00000 PCS IN
		Location :	U2.	
2	2544-7107-0131		IC ICL7107CPL 31/2 Digits A/D W/LED Display "INTERSIL"	2.00000 PCS IN
		Location :	U3,U4	
2	2581-4069-0001		IC 4069UB CMOS HEX INVERTER	1.00000 PCS IN
		Location :	U1.	
2	3201-4148-9002		Si SIGNAL DIODE 1N4148 TNR	2.00000 PCS IN
		Location :	D5,D6.	
2	3232-0010-9482		FAST RECOVERY RECTIFIER 400V/1A RGP10G "FAGOR"	1.00000 PCS IN
2	3679-0101-2002		MICRO FUSE 1A 125V FAST ACTING TYPE W/UL&CSA	1.00000 PCS IN
2	4021-0204-2038		LED EL204HD DIA. 3mm DIFFUSED RED "EVERLIGHT"	1.00000 PCS IN
		Location :	CV.	
2	4157-1056-0601		SEVEN SEGMENTS LED DISPLAY WNDA1056GHB 0.56" GREEN	6.00000 PCS CA
		Location :	LED1-LED6	
2	4510-3030-5041		MPD-DUAL LED PANEL METER A/D PCB 94V0 REV.0 (TECHCOM)	1.00000 PCS IN
2	4543-3030-6042		MPD DUAL LED PANEL METER PCB FR4 94V0 DS PTH (TECHCOM)	1.00000 PCS IN
2	6701-0202-0000		HEAT SINK TO-202	1.00000 PCS IN
		Location :	HS	
2	7050-0208-2911		2 PIN SHROUDED HEADER (180) M241852 "STM" TOP ENTRY TYPE	1.00000 PCS IN
		Location :	JP1	
2	7054-4099-2012		PIN HEADER CONNECTOR 1X40 PIN WAFER P=2.54mm PHB1-S40S-G01	1.15000 PCS IN
		Location :	CN1,CN2,CN3.	
2	7055-0413-2017		FEMALE HEADER 4 PIN PHTCH:2.54mm 2212CS-04T	1.00000 PCS IN
		Location :	CN3	
2	7055-2156-2017		FEMALE HEADER 21 PIN PHTCH:2.54mm 2212CS-21T	2.00000 PCS IN
		Location :	CN1,CN2.	
2	7204-3008-1001		SCREW M3X8X0.5 W/Ni PLATING PAN HEAD CROSS DRIVER	1.00000 PCS IN
		Location :	7805	
2	7304-3006-0900		EXTERNAL TOOTH WASHER M3X6X0.9	1.00000 PCS IN

2	7350-3005-2341		STEEL NUT M3X0.5	1.00000 PCS IN
1	4801-2106-6506		ROCKER SWITCH M372-399-2R3 2P1T W/RED DOT	1.00000 PCS CA
1	6201-9400-0000		PLASTIC FRONT PANEL SPS-9400 WARM GREY 1C W/EMI SHIELDING	1.00000 PCS CA
2	6201-8400-0011		PLASTIC FRONT PANEL SPS-8400 WARM GREY 1C (NO BAND NAME) PC	1.00000 PCS CA
1	6272-9300-0000		LENS 101X35X1mm THK PVC TRANSPARENT BROWN EPD-9300	1.00000 PCS CA
		Location :	FRONT	
1	6281-8400-0000		PLASTIC VOLUME KNOB SPS-8400 WARM GREY 1C PC	1.00000 PCS CA
1	6290-3030-0000		PLASTIC SPACER FOR MPD METER DIA. 6x11mm I.D.=3.5mm	2.00000 PCS CA
1	6701-2500-5010		HEAT SINK FOR GZV2500 W=68 H=10 L=65mm W/M3X0.5 (X4)	1.00000 PCS CA
		Location :	Q12,Q13	
1	6701-4000-5010		HEAT SINK FOR GZV4000 W=65 H=20 10FIN L=76mm	1.00000 PCS CA
		Location :	D15,D16.	
1	6701-8400-0000		HEAT SINK FOR SPS-8400 W=68, H=10, L=75mm	1.00000 PCS CA
		Location :	Q1,Q2.	
0	SPS-9400-IN-000		SPS-9400-000 MATERIALS FOR INSERTION	1.00000 SET IN
1	0513-1001-0611		CARBON FILM RESISTOR 1/4W 10ohm +/-5%	4.00000 PCS IN
		Location :	R55,R60,R5A,R5B.	
1	0513-1002-0611		CARBON FILM RESISTOR 1/4W 100ohm +/-5%	1.00000 PCS IN
		Location :	R22.	
1	0513-1003-0611		CARBON FILM RESISTOR 1/4W 1Kohm +/-5%	3.00000 PCS IN
		Location :	R17,R32,R47.	
1	0513-1004-0611		CARBON FILM RESISTOR 1/4W 10Kohm +/-5%	4.00000 PCS IN
		Location :	R19,R20,R30,R49.	
1	0513-1005-0611		CARBON FILM RESISTOR 1/4W 100Kohm +/-5%	1.00000 PCS IN
		Location :	R27	
1	0513-1006-0611		CARBON FILM RESISTOR 1/4W 1Mohm +/-5%	3.00000 PCS IN
		Location :	R25,R35,R81.	
1	0513-1502-0611		CARBON FILM RESISTOR 1/4W 150ohm +/-5%	1.00000 PCS IN
		Location :	R41	
1	0513-1503-0611		CARBON FILM RESISTOR 1/4W 1.5Kohm +/-5%	2.00000 PCS IN
		Location :	R23,R24.	
1	0513-1504-0611		CARBON FILM RESISTOR 1/4W 15Kohm +/-5%	2.00000 PCS IN
		Location :	R14,R91.	
1	0513-1801-0611		CARBON FILM RESISTOR 1/4W 18ohm +/-5%	1.00000 PCS IN
		Location :	R16	
1	0513-1803-0611		CARBON FILM RESISTOR 1/4W 1.8Kohm +/-5%	1.00000 PCS IN
		Location :	R29.	
1	0513-2003-0611		CARBON FILM RESISTOR 1/4W 2Kohm +/-5%	1.00000 PCS IN
		Location :	R28	
1	0513-2203-0611		CARBON FILM RESISTOR 1/4W 2.2Kohm +/-5%	1.00000 PCS IN
		Location :	R87.	
1	0513-2204-0611		CARBON FILM RESISTOR 1/4W 22Kohm +/-5%	3.00000 PCS IN
		Location :	R4,R26,R86.	
1	0513-2205-0611		CARBON FILM RESISTOR 1/4W 220Kohm +/-5%	1.00000 PCS IN
		Location :	R31.	
1	0513-2403-0611		CARBON FILM RESISTOR 1/4W 2.4Kohm +/-5%	1.00000 PCS IN
		Location :	R83.	
1	0513-2405-0611		CARBON FILM RESISTOR	2.00000 PCS IN

			1/4W 240Kohm +/-5%	
		Location :	R13	
1	0513-3003-0611		CARBON FILM RESISTOR	1.00000 PCS IN
			1/4W 3Kohm +/-5%	
		Location :	R43.	
1	0513-3302-0611		CARBON FILM RESISTOR	3.00000 PCS IN
			1/4W 330ohm +/-5%	
		Location :	R6,R50,R51	
1	0513-3304-0611		CARBON FILM RESISTOR	1.00000 PCS IN
			1/4W 33Kohm +/-5%	
		Location :	R37.	
1	0513-3305-0611		CARBON FILM RESISTOR	1.00000 PCS IN
			1/4W 330Kohm +/-5%	
		Location :	R38.	
1	0513-3903-0611		CARBON FILM RESISTOR	1.00000 PCS IN
			1/4W 3.9Kohm +/-5%	
		Location :	R83.	
1	0513-3905-0611		CARBON FILM RESISTOR	1.00000 PCS IN
			1/4W 390Kohm +/-5%	
		Location :	R88.	
1	0513-4702-0611		CARBON FILM RESISTOR	5.00000 PCS IN
			1/4W 470ohm +/-5%	
		Location :	R44,R54,R53,R58,R59	
1	0513-4703-0611		CARBON FILM RESISTOR	3.00000 PCS IN
			1/4W 4.7Kohm +/-5%	
		Location :	R33,R36,R45.	
1	0513-4704-0611		CARBON FILM RESISTOR	3.00000 PCS IN
			1/4W 47Kohm +/-5%	
		Location :	R46,R48,R82.	
1	0513-4705-0611		CARBON FILM RESISTOR	1.00000 PCS IN
			1/4W 470Kohm +/-5%	
		Location :	R5	
1	0513-5102-0611		CARBON FILM RESISTOR	1.00000 PCS IN
			1/4W 510ohm +/-5%	
		Location :	R34.	
1	0513-5600-0611		CARBON FILM RESISTOR	3.00000 PCS IN
			1/4W 5.6ohm +/-5%	
		Location :	R56,R61,R52.	
1	0513-5602-0611		CARBON FILM RESISTOR	2.00000 PCS IN
			1/4W 560ohm +/-5%	
		Location :	R39,R85.	
1	0513-5604-0611		CARBON FILM RESISTOR	4.00000 PCS IN
			1/4W 56Kohm +/-5%	
		Location :	R21,R90,R40,R001.	
1	0513-6800-0611		CARBON FILM RESISTOR	1.00000 PCS IN
			1/4W 6.8ohm +/-5%	
		Location :	R15	
1	0513-6805-0611		CARBON FILM RESISTOR	1.00000 PCS IN
			1/4W 680Kohm +/-5%	
		Location :	R100	
1	0513-9103-0611		CARBON FILM RESISTOR	1.00000 PCS IN
			1/4W 9.1Kohm +/-5%	
		Location :	R89	
1	0515-3302-0611		CARBON FILM RESISTOR	1.00000 PCS IN
			1W 330ohm +/-5%	
		Location :	R68	
1	0522-1204-0411		METAL FILM RESISTOR	1.00000 PCS IN
			1/4W 12Kohm +/-1%	
		Location :	R2	
1	0522-1306-0411		METAL FILM RESISTOR	1.00000 PCS IN
			1/4W 1.3Mohm +/-1%	
		Location :	R1.	
1	0522-1504-0411		METAL FILM RESISTOR	1.00000 PCS IN
			1/4W 15Kohm +/-1%	
		Location :	R42.	
1	0522-6205-0411		METAL FILM RESISTOR	1.00000 PCS IN
			1/4W 620Kohm +/-1%	
		Location :	R9	
1	0522-6805-0411		METAL FILM RESISTOR	1.00000 PCS IN
			1/4W 680Kohm +/-1%	
		Location :	R9	
1	0522-8503-0411		METAL FILM RESISTOR 1/4W	1.00000 PCS IN
			8.5Kohm +/-1%	
		Location :	R10	
1	0525-0100-0411		METAL FILM RESISTOR 0.1ohm 2W	14.00000 PCS IN

			+/-5%	
		Location :	R7,R8,R69-R80	
1	0534-1005-0611		METAL OXIDE RESISTOR 100Kohm 1W +/-5%	3.00000 PCS IN
		Location :	R3,R11,R12	
1	0534-1501-0611		METAL OXIDE RESISTOR 15ohm 1W	2.00000 PCS IN
		Location :	R66,R67.	
1	0536-4701-0611		METAL OXIDE RESISTOR 47ohm 3W +/-5% WIRE LENGTH=30mm	2.00000 PCS IN
		Location :	R65,R84.	
1	0600-2103-4010		VARIABLE RESISTOR 10K CURVE B CTS 296UD103B1N +/-20%	1.00000 PCS IN
		Location :	VR1	
1	0685-2103-1110		SEMI-FIXED POTENTIOMETER SCR-065A 1K(B) +/- 25% DIA.6mm	1.00000 PCS IN
		Location :	RV4	
1	0685-2503-1110		SEMI-FIXED POTENTIOMETER SCR-065A 5K(B) +/- 25% DIA.6mm	2.00000 PCS IN
		Location :	RV2,RV3.	
1	1011-1031-0171		CERAMIC CAPACITOR 0.001UF 50V +80%/-20%	4.00000 PCS IN
		Location :	C9,C20,C21,C35.	
1	1011-1032-0291		CERAMIC CAPACITOR 1000PF 1KV +/-20%	3.00000 PCS IN
		Location :	C42,C56,Q6->Q8.	
1	1011-1041-0171		CERAMIC CAPACITOR 0.01UF 50V +80%/-20%	6.00000 PCS IN
		Location :	C6,C32,C39,C55,C57,C60.	
1	1011-1042-1261		CERAMIC CAPACITOR 0.01UF 500V +80%/-20%	1.00000 PCS IN
		Location :	C12	
1	1011-1051-0171		CERAMIC CAPACITOR 0.1UF 50V +80%/-20%	6.00000 PCS IN
		Location :	C16,C23,C25,C37,C58,C61.	
1	1011-2231-0191		CERAMIC CAPACITOR 2200PF 100V +80%/-20%	1.00000 PCS IN
		Location :	C71	
1	1011-4731-0171		CERAMIC CAPACITOR 0.0047uF 50V +80%/-20%	2.00000 PCS IN
		Location :	C43,C47.	
1	1021-1062-0171		ELECT. CAPACITOR 1UF 50V +/-20% DIM. 5 X 11 MM	4.00000 PCS IN
		Location :	C7,C15,C27,C38.	
1	1021-1072-0171		ELECT. CAPACITOR 10UF 50V +/-20% DIM. 5 X 11 MM	6.00000 PCS IN
		Location :	C18,C19,C22,C24,C33,C34.	
1	1021-1082-0151		ELECT. CAPACITOR 100UF 25V +/-20% DIM. 6.3 X 11 MM	2.00000 PCS IN
		Location :	C59,C62.	
1	1021-1082-0171		ELECT. CAPACITOR 100UF 50V +/-20% DIM. 8 X 11.5MM	1.00000 PCS IN
		Location :	C8	
1	1021-2282-0151		ELECT. CAPACITOR 220UF 25V +/-20% DIM. 8 X 11.5 MM	2.00000 PCS IN
		Location :	C14,C36	
1	1021-4772-0141		ELECT. CAPACITOR 47UF 16V +/-20% DIM. 5 X 11 MM	1.00000 PCS IN
		Location :	C17	
1	1021-4782-0151		ELECT. CAPACITOR 470UF 25V +/-20% DIM. 10 X 12.5 MM	1.00000 PCS IN
		Location :	C13	
1	1022-1032-0151		ELECT. CAPACITOR 1000UF 25V +/-20% DIM. 10 X 20 MM	2.00000 PCS IN
		Location :	C52,C53	
1	1022-4732-0311		ELECT. CAPACITOR 4700UF 25V +/-20% 105 C DIM. 16 X 35.5 MM	1.00000 PCS IN
		Location :	C50	
1	1022-6882-4231		ELECT. CAPACITOR 680UF 250V 85C +/-20% 22X56mm LP SERIES	2.00000 PCS IN
		Location :	C10,C11	
1	1028-3352-0171		NON-POLAD ELECT CAPACITOR 0.33uF 50V +/-20% DIM 5X11mm	3.00000 PCS IN
		Location :	C28,C29,C51.	
1	1035-1053-0241		METALLIZED CAPACITOR 0.1UF 275VAC X2	1.00000 PCS IN

		Location :	C2.	
1	1035-1062-0241		METALLIZED CAPACITOR 1UF 275VAC X2	2.00000 PCS IN
		Location :	C1	
1	1035-3333-4231		CERAMIC CAP. 3300pF/250VAC +/-10% PITCH=10mm Y2	1.00000 PCS IN
		Location :	C4B	
1	1061-2243-0271		METALLIZED POLYESTER CAP 0.022uF 630V +/-10%	1.00000 PCS IN
		Location :	C70.	
1	1061-3363-0231		METALLIZED POLYESTER CAP. 3.3uF 250V +/-10% (MEF)	1.00000 PCS IN
		Location :	C41	
1	1061-3363-0251		METALLIZED POLYESTER CAP. 3.3uf 400VDC +/-10% 31X18X9mm	2.00000 PCS IN
		Location :	C3,C5.	
1	1094-1033-0171		MYLAR CAPACITOR 0.001UF 50V +/-10%	2.00000 PCS IN
		Location :	C26,C30.	
1	1094-2253-0191		MYLAR CAPACITOR 0.22UF 100V +/-10%	2.00000 PCS IN
		Location :	C49,C54.	
1	1094-3333-0191		MYLAR CAPACITOR 0.0033UF 100V +/-10%	4.00000 PCS IN
		Location :	C44,C45,C46,C48	
1	1094-4733-1191		MYLAR CAPACITOR 0.0047UF 100V +/-10% PITCH=5mm	2.00000 PCS IN
		Location :	C72,C73.	
1	1095-1062-1171		MONO CAPACITOR 1UF / 50V +/-20%	2.00000 PCS IN
		Location :	C31.	
1	1501-5021-3312		POWER INDUCTOR 3.3uH +/-20% 500mA 3R3M-A12X-BL-N	1.00000 PCS IN
		Location :	L4.	
1	2533-0222-0458		PWM SWITCH TOP222Y "TOPSWITCH"	1.00000 PCS IN
		Location :	U2	
1	2533-0494-0210		IC TL494CN "TI" PWM CONTROLLER	1.00000 PCS IN
		Location :	U5.	
1	2534-3262-0041		IC MC33262P "ON" POWER FACTOR CONTROLLER	1.00000 PCS IN
		Location :	U1	
1	2541-0324-0061		IC LM324N "ST" LOW POWER QUAD OP-AMP	1.00000 PCS IN
		Location :	U3.	
1	2581-4069-0001		IC 4069UB CMOS HEX INVERTER	1.00000 PCS IN
		Location :	U4.	
1	3010-2120-2401		NPN GENERAL PURPOSE TRANSISTOR 2SC2120Y "TOSHIBA" TO-92	2.00000 PCS IN
		Location :	Q6,Q8	
1	3017-1815-0001		NPN SMALL SIGNAL TRANSISTOR 2SC1815GR TO-92	2.00000 PCS IN
		Location :	Q4,Q5.	
1	3023-0950-0001		POWER PNP TRANSISTOR A950 "TOSHIBA"	6.00000 PCS IN
		Location :	Q3,Q7,Q9,Q10,Q11,Q14.	
1	3201-4148-9002		Si SIGNAL DIODE 1N4148 TNR	10.00000 PCS IN
		Location :	D1,D6-D14.	
1	3222-0105-9510		BRIDGE RECTIFIER SB105 600V/10A SB-10 "TS"	1.00000 PCS IN
		Location :	BR1	
1	3231-4005-9531		FAST RECOVERY RECTIFIER 600V/1A UF4005 "MCC" DO-41	1.00000 PCS IN
		Location :	D3	
1	3231-6008-0007		FAST RECOVERY DIODE MUR860 600V/8A TO-220AC	1.00000 PCS IN
		Location :	D2	
1	3232-0010-9482		FAST RECOVERY RECTIFIER 400V/1A RGP10G "FAGOR"	1.00000 PCS IN
		Location :	D5	
1	3261-1311-0002		ZENER DIODE 13V 1W TNR	1.00000 PCS IN
		Location :	ZD3.	
1	3261-1511-0002		ZENER DIODE 15V 1W TNR "1N4744A"	2.00000 PCS IN
		Location :	ZD4,ZD5	
1	3261-2021-0042		ZENER DIODE 200V 1W TNR	1.00000 PCS IN

			"ON" IN5956B	
		Location :	ZD1.	
1	3261-6200-5311		ROHM 0.5W ZENER 6.2V MTZJ6.2B	1.00000 PCS IN
		Location :	ZD1	
1	3620-0605-3001		NTC POWER THERMISTOR 6A 10ohm	1.00000 PCS IN
			at 25DEG. JNR20S100L "JOYIN"	
		Location :	PCB(C)	
1	4351-2052-6215		WIRE ASSEMBLY UL1007 #22 2 PIN	1.00000 PCS IN
			x205+4mm W/XH HOUSING	
1	4856-1205-1010		SLIDE SWITCH SS-12F07B-G2 1P2T	1.00000 PCS IN
			0.5A 50V DC	
		Location :	S2.	
1	6701-0202-0000		HEAT SINK TO-202	1.00000 PCS IN
		Location :	D2	
1	6701-4000-0001		HEAT SINK FOR BRIDGE (SB-105)	1.00000 PCS IN
			25X25X2.0mm THK. ALUMINIUM	
1	6890-0950-0001		COPPER CONDUCTOR FOR ME-950	2.00000 PCS IN
			14mm(W)X54.5(L)X1.0mm THK.	
		Location :	CN1,CN2	
1	6890-0950-0002		COPPER CONDUCTOR FOR ME-950	2.00000 PCS IN
			14mm(W)X37.5(L)X1.0mm THK.W/Ni	
		Location :	CN3,CN4.	
1	7040-0000-1214		FASTON TAB TERMINAL 250	4.00000 PCS IN
			BRASS W/TIN PLATED P-850	
		Location :	PT1,PT2,PT3,PT4	
1	7050-0312-4999		3 PIN MOLEX PCB TYPE MALE	1.00000 PCS IN
			PITCH=3.96mm "5273 SERIES"	
1	7122-2003-0170		EYELET O.D. 1.7x3mm(L) BRASS	3.00000 PCS IN
			W/NICKEL PLATING	
1	7122-2004-0420		EYELET O.D. 4.2X4.5mm (L)	3.00000 PCS IN
			BRASS W/NICKEL PLATING	
1	8710-9400-3199		SPS-9400 AUX TRANSFORMER	1.00000 PCS IN
			SUB-ASSEMBLY CE VERSION	
		Location :	TR2	
1	8761-4000-0099		OUTPUT FILTER INDUCTOR	1.00000 SET IN
			0.5uH/40A	
		Location :	L6	
1	8761-4000-2099		COMMON MODE CHOKE COIL	1.00000 SET IN
			ASSEMBRY 6MH X2	
1	8761-4000-4099		INPUT FILTER INDUCTOR	2.00000 PCS IN
			SUB.ASSEMBLY 100uH	
		Location :	L2,L3.	

End